

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re the Application of: **Miwa KOZAWA et al.**

Art Unit: **1795**

Application Number: **10/670,291**

Examiner: **Daborah Chacko-Davis**

Filed: **September 26, 2003**

Confirmation Number: **6427**

For: **RESIST PATTERN THICKENING MATERIAL, PROCESS FOR FORMING  
RESIST PATTERN, AND PROCESS FOR MANUFACTURING  
SEMICONDUCTOR DEVICE**

Attorney Docket Number: **031181**

Customer Number: **38834**

**PRE-APPEAL BRIEF REQUEST FOR REVIEW**

Mail Stop: AF

March 4, 2010

Commissioner for Patents

P.O. Box 1450

Alexandria, VA 22313-1450

Sir:

This Request is filed concurrent with a Notice of Appeal in compliance with 37 C.F.R. §41.31. Applicants request review of the final rejection in the above-identified application. No amendments are being filed with this request.

### **REMARKS**

Claims 1, 2, 5, 7, 8 and 13-22 are currently pending. Claims 1, 2, 5, 7, 8 and 13-18 are rejected under 35 USC §103(a) as being unpatentable over Japanese No. 2001-109165 (Kanda et al.) in view of USP 5,981,147 (Hallock et al.) and U.S. Publication No. 2002/0192593 (Nagai et al.); claims 19 and 20 are rejected under 35 USC §103(a) over these references further in view of USP 6,319,853 (Ishibashi et al.); and claims 21 and 22 are rejected under 35 USC §103 over Kanda et al, Hallock et al, Nagai et al. and Kobayakawa et al.

Kanda et al. (JP 2001-109165) discloses the following in paragraphs [0007] and [0008]:

[0007]

[Means for Solving the Problem]In [ as a result of this invention persons' performing research and examination wholeheartedly ] the above-mentioned pattern formation method, After forming a not less than 2-micrometer resist pattern on a processing substrate, as a previous process or/and a post process of a process of forming an enveloping layer which constructs a bridge under existence of acid on the resist pattern, If a process of carrying out irradiation treatment of the resist pattern by visible light with a wavelength of 150-450 nm or ultraviolet rays is added, it will find out that can prevent modification of a resist pattern after enveloping layer development, and bridge construction of an enveloping layer is performed efficiently, and this invention will be accomplished.

[0008]Namely, in a pattern formation method which this invention provides [ pattern formation method ] an enveloping layer which constructs a bridge under existence of acid on a resist pattern of not less than 2-micrometer thickness, constructs [ pattern formation method ] a bridge in this enveloping layer by diffusion of acid from a resist pattern, and fattens a resist pattern, Before forming an enveloping layer, and/or after forming an enveloping layer, it is related with a pattern formation method irradiating with a resist pattern by visible light with a wavelength of 150-450 nm or ultraviolet rays. After this invention forms a pattern with a described method, it performs plating

treatment further and relates to a method of manufacturing a magnetic head.

Emphasis added by the applicant.

Please note that the above is a quote from mechanical translation provided by the Japan Patent Office, and the term “bridge” denotes “crosslinking”.

The following is the corresponding description in the family EP publication (1 223 470 A1) of Kanda et al. for better understanding.

Disclosure of the Invention

**[0007]** As a result of intensive investigations, the inventors have found that deformation of the resist pattern to be caused after developing the coating layer can be prevented and that cross-linking of the coating layer can be effectively conducted by adding a step of irradiating a resist pattern with visible light or ultraviolet rays of 150 to 450 nm in wavelength before and/or after the step of forming the coating layer capable of being cross-linked in the presence of an acid on the resist pattern of 2  $\mu$ m or more in thickness having been formed on a substrate, thus having achieved the present invention based on the finding.

**[0008]** That is, the present invention relates to a method for forming a pattern by providing on a resist pattern of 2  $\mu$ m in thickness a coating layer capable of being cross-linked in the presence of an acid and then cross-linking the coating layer with an acid diffused from the resist pattern to thereby thicken the resist pattern, wherein the resist pattern is irradiated with visible light or UV rays of 150 to 450 nm in wavelength before and/or after formation of the coating layer.

**[0009]** In addition, the present invention relates to a method of manufacturing a magnetic head by conducting a metal plating treatment after formation of the pattern in the above-described manner.

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As disclosed therein, crosslinking is the function of the enveloping layer (coating layer) of Kanda et al. This crosslinking may be achieved by including a crosslinking agent in the enveloping layer (coating layer) formation material, as disclosed in paragraph [0013] of Kanda et al. that “A water soluble resin composition which contains a surface-active agent etc. as an enveloping layer formation material which can be used in this invention water soluble resin, a cross linking agent, and if needed is mentioned as a desirable thing” (or “As the coating layer-forming materials to be used in the present invention, water-soluble resin, a cross-linking agent and, if necessary, a surfactant and the like are illustrated as preferable ones” in paragraph [0019] of EP ‘470). Thus, a crosslinking agent is a mandatory component in the enveloping

layer formation material of Kanda et al. for forming an enveloping layer on a resist pattern.

Regarding the disclosures of Kanda et al, the present Office Action points out as follows at the second paragraph in item 2 at page 2:

Kanda, in the abstract, in [0001], [0013], [0017], [0019], [0020], discloses a coating material that fattens the resist pattern (resist pattern thickening material, includes an ArF resist such as acrylic resin) comprising a water-soluble resin, a non-ionic surfactant, and an organic solvent (claims 1-2, 5, and 13).

The Office Action picks up a water-soluble resin, a nonionic surfactant and an organic solvent from the enveloping layer formation material of Kanda et al, but ignores the crosslinking function and crosslinking agent. However, the composition of Kanda et al. is not effective without a crosslinking agent, and the object of Kanda et al. cannot be accomplished without the crosslinking agent. That is, the function of Kanda et al. is destroyed without the presence of the crosslinking agent.

The Examiner has erred in ignoring the essential crosslinking agent of Kanda et al. A skilled artisan would not remove the crosslinking agent from the composition of Kanda et al. when combined with the other references, particularly when he starts with the composition of Kanda et al. and varies the types and amount of the surfactant included therein.

The resist pattern thickening material of claim 1 consists of at least one resin, at least one surfactant, water, and optionally organic solvent, thermal acid generating agents and quenchers, and it includes no other components.

Thus, even though the types and amount of the surfactants in the composition of Kanda et al. could be modified based on the disclosures of Hallock or Nagai, the resultant composition

must still include a crosslinking agent, which differs from the material of claim 1 and claims depending therefrom.

If this paper is not timely filed, Applicants respectfully petition for an appropriate extension of time. The fees for such an extension or any other fees that may be due with respect to this paper may be charged to Deposit Account No. 50-2866.

Respectfully submitted,  
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Attachments: Notice of Appeal (Form PCT/SB/31)  
Pre-Appeal Brief Request for Review (Form PCT/SB/33)  
Petition for Extension of Time (Form PCT/SB/22)